



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,066	09/16/2003	Jongill Hong	0941.68363	3251

24978 7590 08/05/2005

GREER, BURNS & CRAIN
300 S WACKER DR
25TH FLOOR
CHICAGO, IL 60606

EXAMINER

BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
----------	--------------

1773

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/664,066

Applicant(s)

HONG ET AL.

Examiner

Kevin M. Bernatz

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8 and 10-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Response to Amendment

1. Amendments to claims 1 and 10 and cancellation of claims 3, 4, and 9, filed on May 20, 2005, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Information Disclosure Statement

3. The correct surname of the inventor for U.S. Patent No. 6,181,534 is noted.

Examiner's Comments

4. Regarding the limitation(s) "an effective magnetic layer thickness, excluding a thickness of a magnetically dead layer" in claims 1 and 10, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that applicants' arguments are convincing and the Examiner has adopted applicants position regarding the meaning of the claimed limitation, i.e. that the magnetic layer is either a single magnetic "sublayer" or that the magnetic layer comprises a laminate structure including a single

non-magnetic layer (i.e. applicants' "a magnetically dead layer"), wherein the thickness of the magnetic layer includes any magnetic "sublayers" but not the thickness of the non-magnetic layer. E.g. a synthetic free layer comprising two ferromagnetic layers separated by a thin antiferromagnetic coupling layer would read on the "ferromagnetic free layer" provided the combined thickness of the two magnetic layers, excluding the thickness of the coupling layer, met the claimed limitations.

Request for Continued Examination

5. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on May 20, 2005 is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 103

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (U.S. Patent No. 6,181,534 B1).

Regarding claim 10, Gill discloses a magnetic storage apparatus for reading information from a magnetic recording medium (*Figures 1 – 7*), including a magnetoresistive spin-valve sensor (MR spin-valve sensor) which reads information from the magnetic recording medium (*col. 1, lines 5 – 17*), said MR spin-valve sensor comprising a magnetic layer (*Figure 9, element 312*), the magnetic layer has an effective magnetic layer thickness, excluding a thickness of a magnetically dead layer (*i.e. 0*), greater than 0 and less than approximately 40 Å (*Figure 9 – 24 Å*), another

magnetic layer which forms a pinned layer (*element 310*), a spacer layer interposed between the two magnetic layers (*element 308*), a specular layer made of a metal oxide (*element 322*), a back layer (*element 318*) interposed between the magnetic layer and the specular layer, and a metal layer (*col. 8, line 51 bridging col. 9, line 13 – Ta cap not shown in Figure 9*) disposed adjacent to the specular layer, opposite to the back layer, and made of a material meeting applicants' claimed limitations per the definition given to the limitation in Paragraph 2 of the Office Action mailed July 8, 2004.

While Gill discloses back layers of Cu, Au and/or Ag (*col. 8, lines 51 – 55*), Gill fails to explicitly disclose an embodiment utilizing an alloy of 2 or more of these elements, as per applicants' claimed invention.

However, the Examiner notes that it is *prima facie* obvious to combine two compositions/elements each of which is taught by the prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose. The idea of combining them flows logically from their having been individually taught in the prior art, thus the claims require no more than mixing together of two or more conventional metal elements disclosed for the identical use. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Gill to utilize an alloy of AuCu, AgCu or AuAgCu since the idea of combining them flows logically from their having been individually taught in the prior art as being useful for the very same purpose.

7. Claims 1, 2, 5 – 8 and 10 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (U.S. Patent No. 6,181,534 B1) in view of Kamiguchi et al. (U.S. Patent No. 6,495,275 B2).

[The Examiner has included claim 10 in this grouping as well as above since the Examiner deems that the exclusion of defining the first magnetic layer as the magnetic "free layer" was an inadvertent omission by applicants and as a courtesy, the Examiner is including the rejection predicated upon such an inclusion for applicants' consideration].

Regarding claims 1 and 10, Gill discloses a magnetic storage apparatus for reading information from a magnetic recording medium (*Figures 1 – 7*), including a magnetoresistive spin-valve sensor (MR spin-valve sensor) which reads information from the magnetic recording medium (*col. 1, lines 5 – 17*), said MR spin-valve sensor comprising a magnetic layer, the magnetic layer forming a free layer (*Figure 9, element 316*), another magnetic layer which forms a pinned layer (*element 306*), a spacer layer interposed between the two magnetic layers (*element 314*), a specular layer made of a metal oxide (*element 322*), a back layer (*element 318*) interposed between the magnetic layer and the specular layer, and a metal layer (*col. 8, line 51 bridging col. 9, line 13 – Ta cap not shown in Figure 9*) disposed adjacent to the specular layer, opposite to the back layer, and made of a material meeting applicants' claimed limitations per the definition given to the limitation in Paragraph 2 of the Office Action mailed July 8, 2004.

While Gill discloses back layers of Cu, Au and/or Ag (*col. 8, lines 51 – 55*), Gill fails to explicitly disclose an embodiment utilizing an alloy of 2 or more of these elements, as per applicants' claimed invention.

However, the Examiner notes that it is *prima facie* obvious to combine two compositions/elements each of which is taught by the prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose. The idea of combining them flows logically from their having been individually taught in the prior art, thus the claims require no more than mixing together of two or more conventional metal elements disclosed for the identical use. *In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Gill to utilize an alloy of AuCu, AgCu or AuAgCu since the idea of combining them flows logically from their having been individually taught in the prior art as being useful for the very same purpose.

While Gill discloses a 45 Å free magnetic layer, Gill fails to explicitly disclose using free magnetic layers meeting applicants' claimed thickness limitation.

However, Kamiguchi et al. teach that the thickness of the free magnetic layer effects the magnetoresistive properties of a MR sensor and thickness values meeting applicants' claimed range are equivalent to the thickness value used by Gill (*col. 10, line 20 bridging col. 11, line 40 and Examples*). Therefore, the Examiner deems that it would have been obvious to one having ordinary skill in the art to determine a magnitude of the free layer thickness meeting applicants' claimed thickness range by

optimizing the results effective variable through routine experimentation. *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claim 2, Gill discloses specular layers meeting applicants' claimed Markush limitations (*Figure 9: "NiO"*).

Regarding claim 5, Gill discloses back layers meeting applicants' claimed thickness limitations (*Figure 9, "15 Å"*).

Regarding claims 6 – 8, the Examiner notes that these alloys are met for the reasons discussed above since the "range" claimed by applicants is essentially any alloy. Hence, there is no criticality claimed for a specific alloy composition.

Regarding claims 11 - 13, Gill discloses a specular layer meeting applicants' claimed Markush limitation (*Figure 9: "NiO"*), a metal layer meeting applicants' claimed Markush limitations ("*Ta*"), a back layer meeting applicants' claimed thickness limitation ("*15 Å*") meeting applicants' claimed composition for the reasons expressed above with respect to claims 6 – 8.

Response to Arguments

8. The rejection of claim 10 under 35 U.S.C § 103(a) - Gill

Applicant(s) argue(s) that Gill "fails to disclose or suggest a magnetoresistive spin valve sensor that includes, *inter alia*, a magnetic layer "forming a free layer and having an effective magnetic layer thickness" meeting applicants' claimed thickness requirement (*page 8 of response*). The examiner respectfully disagrees.

The Examiner notes that claim 10 does not require that the magnetic layer be the “free layer”, hence the additional sublayer of the synthetic pinned layer reads on the claimed limitations.

Applicants further argue that “the Examiner’s response lacks the required showing of a motivation as to why one of ordinary skill in the art would have substituted any of the claimed materials (AuCu, AgCu, AuAgCu) for the materials disclosed by Gill (Cu, Au or Ag) (*page 9 of response*). The Examiner respectfully disagrees.

As clearly stated in *In re Kerkhoven*, the idea of combining them flows logically from their having been individually taught in the prior art as being useful for the very same purpose.

Finally, applicants argue that the Examiner is improperly reading limitations from the specification into claim 10 with regard to the limitation “a metal which improves GMR performance” (*pages 10 – 11 of response*). The Examiner respectfully disagrees.

While the Examiner agrees that generally it is impermissible to read limitations from the specification into the claims, the Examiner notes that the claims must be read in view of the specification. Given that there are essentially an *infinite* number of “metals” and that it would be an impermissible burden on the public to require them to test each and every of these metals as to whether they would meet the broadly claimed functional limitation “a metal which improves GMR performance”, the Examiner deems that the only scope that can realistically be associated with such a limitation are those metals which applicants have disclosed are capable of being used as the metal layer. Either applicants’ claim is non-enabled for containing subject matter which was not

described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, or the claim is definite within the scope afforded by the specification when the claim is read in light of the specification. The Examiner has deemed that the latter is the more appropriate handling of the claim in this instance.

9. The rejection of claims 1, 2, 5 – 8 and 10 - 13 under 35 U.S.C § 103(a) – Gill in view of Kamiguchi et al.

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

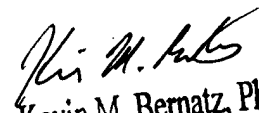
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
August 1, 2005


Kevin M. Bernatz, PhD
Primary Examiner